

Claims

1. A composition, preferably lyophilizate, for carrying out chemical reactions, in particular for the polymerase chain reaction, comprising
  - i) a solution comprising a polymerase, preferably DNA polymerase, especially Taq polymerase;
  - ii)  $MgCl_2$  and, where appropriate, at least one further alkali metal and/or alkaline earth metal halide, preferably KCl;
  - iii) deoxyribonucleotide triphosphates (dNTPs);
  - iv) at least one, preferably two primers;
  - v) a stabilizer, preferably a disaccharide, especially trehalose;
  - vi) substances for detection of the reaction product; and
  - vii) where appropriate further additives.
2. The composition as claimed in claim 1, characterized in that the substances for detection of the reaction product are fluorescent dyes which are preferably bound to in each case an anchor oligonucleotide and a sensor oligonucleotide.
3. A unit, preferably cartridge, for preparing reaction mixtures for chemical reactions, especially for the polymerase chain reaction, comprising an inlet and an outlet, and at least one support, preferably a membrane, characterized in that the composition as claimed in claim 1 is bound, preferably as lyophilizate, to at least one support.
4. The unit as claimed in claim 3, characterized in that a device for applying elevated pressure or reduced pressure is provided.

5. The unit as claimed in either of claims 3 or 4, characterized in that a capillary is attached above the inlet.  
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6. The unit as claimed in any of claims 3 to 5, characterized in that one or more additional membranes or supports, preferably 4 additional membranes, are present between the inlet and the support to which the composition as claimed in  
10 either of claims 1 or 2 is bound.
7. The unit as claimed in claim 6, characterized in that at least one additional support, preferably a  
15 membrane, is designed, preferably by providing diethylaminoethyl groups, so that polynucleotides can be bound thereto.
8. The unit as claimed in claim 7, characterized in that the additional membrane is impregnated with a  
20 substance which increases the surface tension of a liquid, preferably with a polydimethylsiloxane.
9. The unit as claimed in any of claims 6 to 8, characterized in that a substance which absorbs  
25 solids, preferably Aerosil, is provided in the space between two membranes.
10. The unit as claimed in any of claims 6 to 9, characterized in that the additional membrane  
30 located closest to the inlet is impregnated with a lysing agent.
11. The unit as claimed in any of claims 6 to 10, characterized in that a unit for supplying a  
35 liquid, preferably an eluent, is provided above the support provided for binding polynucleotides.

12. The unit as claimed in claim 11, characterized in that the unit for supplying a liquid is separated from the interior of the unit by a membrane, which can be made permeable on application of reduced pressure.
13. A method for preparing reaction mixtures for chemical reactions, in particular for the polymerase chain reaction, comprising the steps:
- a) introducing a sample into the unit as claimed in any of claims 3 to 12;
- b) passing the samples through a support, preferably a membrane, to which a composition as claimed in either of claims 1 or 2 is bound, so that the finished reaction mixture emerges from the outlet of the unit.
14. The method as claimed in claim 13, characterized in that between steps a) and b) the additional steps of
- a1) lysis of cells in the sample
- a2) separation of the polynucleotides from other sample constituents are carried out.
15. The method as claimed in claim 14, characterized in that step a1) takes place by contacting the sample with a membrane impregnated with lysing agent.
16. The method as claimed in either of claims 14 or 15, characterized in that step a2) comprises binding the polynucleotides to a membrane, removal of the other sample constituents and subsequent elution of the polynucleotides from this membrane with the aid of an eluent, preferably a high-salt solution which comprises no chelating substances.

17. The method as claimed in any of claims 14 to 16, characterized in that in step a2) the sample is guided through 1 or more membranes, preferably 4 membranes.
- 5 18. The method as claimed in any of claims 14 to 17, characterized in that in step a2) the sample is guided through a substance which absorbs solids.
- 10 19. A device for preparing reaction mixtures for chemical reactions, in particular for the polymerase chain reaction, comprising
- 15 a) at least one, preferably three units, preferably cartridges, as claimed in any of claims 3 to 12;
- b) at least one reaction device which is connected via an aperture to the outlet of a unit and, after charging with a reaction mixture, can be separated from the sample preparation device.
- 20 20. The device as claimed in claim 19, characterized in that at least one reaction device can, after the charging with a reaction mixture, be taken out of the sample preparation device and transferred
- 25 into a device for carrying out and, where appropriate, evaluating a chemical reaction, preferably a polymerase chain reaction.
- 30 21. The device as claimed in claim 19 or 20, further comprising a device for carrying out and evaluating a chemical reaction, preferably a polymerase chain reaction, characterized in that the at least one unit can, after charging of the reaction device, be separated from the remaining
- 35 device.
22. The use of a composition as claimed in either of claims 1 or 2 for preparing reaction mixtures for

chemical reactions, in particular for the polymerase chain reaction.

23. The use of a unit as claimed in any of claims 3 to  
5 12 for preparing reaction mixtures for chemical  
reactions, in particular for the polymerase chain  
reaction.
24. The use of a sample preparation device as claimed  
10 in any of claims 19 to 21 for preparing reaction  
mixtures for chemical reactions, in particular for  
the polymerase chain reaction.
25. A method for identifying polynucleotides,  
15 preferably DNA, in a sample, comprising the  
preparation of a reaction mixture for a polymerase  
chain reaction in a unit as claimed in any of  
claims 3 to 12, transferring the reaction mixture  
20 into a reaction device and carrying out and  
evaluating a polymerase chain reaction.